

REMARKS

The Office Action mailed June 11, 2003, has been received and reviewed. Claims 3, 7, 12, 15, 16, 18, and 20 through 24 are currently pending in the application. Claims 3, 4, 7, 8, and 12 through 27 stand rejected. Claims 1, 2, 5, 6, and 9 through 11 have previously been canceled. Claims 4, 8, 13, 14, 17, 19 and 25 through 27 are canceled. Applicant has amended claims 3, 7, 12, and 22 through 24 and respectfully request reconsideration of the application as amended herein.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 5,293,072 to Tsuji et al. taken together with JP 06-151,492

Claims 3, 7, 12, 15, 16, 18, 20 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,293,072 to Tsuji et al. ("Tsuji") taken together with JP 06-151,492 ("492"). Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of claims 3, 7, 12, 15, 16, 18, 20 and 21 are improper because the references taken alone or in combination do not teach or suggest all the claim limitations.

The '492 reference teaches that an encapsulant mold may be oriented vertically. However, the reference appears to be silent regarding recesses that support the balls of a BGA assembly.

The Tsuji reference teaches that precisely sized spherical terminal members may be aligned with depressions formed in the interior of an encapsulation mold wherein the depressions are sized and configured with a circular opening that is smaller than the diameter of a corresponding spherical terminal member. Col. 4, lines 27-44. Such a configuration allows for placement and retention of the precisely sized spherical terminal members in relation to the associated depressions by way distributing the spherical terminal members over the depressions in combination with a vacuum (negative) pressure generated within the depressions. Col. 3, lines 52-57; Col. 4, lines 27-44.

Independent Claim 3, as presently amended, recites the presence of at least one encapsulant restraining cavity having at least one surface with recesses formed therein, each of said recesses having an imperforate boundary wall that is sized and configured to at least partially substantially conformally receive one of a plurality of conductive structures protruding from a substrate positionable in said at least one cavity.

Neither the Tsuji reference nor the '492 reference, taken alone or in combination, teach or suggest an encapsulant restraining cavity having a plurality of recesses, each recess having an imperforate boundary wall that is sized and configured to at least partially substantially conformally receive one of a plurality of conductive structures protruding from a substrate positionable in said at least one cavity. Rather, Tsuji specifically teaches that the depressions are sized and configured with a circular opening that is smaller than the diameter of a corresponding spherical terminal member. Col. 4, lines 27-44. Therefore, Applicant respectfully requests reconsideration and allowance of independent Claim 3. In addition, the depressions of Tsuji are perforate, each having an aperture for communicating a vacuum (negative) pressure therein.

In addition, it would not be obvious to combine the Tsuji reference with the '492 reference because Tsuji specifically teaches that the depressions are sized and configured with a circular opening that is smaller than the diameter of a corresponding spherical terminal member. Col. 4, lines 27-44. Therefore, Tsuji teaches away from recesses configured to at least partially substantially conformally receive one of a plurality of conductive structures protruding from a substrate positionable in said at least one cavity.

In addition, there is no motivation to combine the references. More particularly, Tsuji relies on gravity and vacuum pressure in combination with a horizontal orientation to distribute the spheres upon the depressions. Col. 3, lines 16-32. The '492 reference teaches that an encapsulant mold may be oriented vertically. Therefore, the proposed combination requires a mold that may be positionable in *both a horizontal and a vertical orientation*, in order to retain the benefits of the Tsuji invention. However, there is no teaching or suggestion, found in the references for a mold apparatus that is *selectively positionable in both a horizontal and vertical orientation*. Applicant respectfully submits that there is no teaching or suggestion of the attendant equipment and fixtures that would be necessary to operate a mold apparatus that is selectively positionable in both a horizontal and vertical orientation. Rather, Applicant respectfully submits that Tsuji and the '492 reference teach and suggest respective orientations suited for their purposes.

Claim 16 depends directly from independent claim 3, which is allowable. Applicant respectfully requests reconsideration and allowance of dependent claim 16.

Independent Claim 7, as presently amended, includes recesses, each of said recesses defined by an imperforate boundary wall that is sized and configured to substantially conformally receive one of a plurality of conductive structures protruding from a substrate positionable in said at least one cavity. The references, taken alone or in combination, fail to teach or suggest all of the claim limitations. Applicant respectfully requests reconsideration and allowance of independent Claim 7.

Claim 18 depends directly from independent Claim 7, which is allowable. Applicant respectfully requests reconsideration and allowance of dependent Claim 18.

Similarly, independent Claim 12, as presently amended, includes recesses, each of said recesses defined by an imperforate boundary wall that is sized and configured to substantially conformally at least partially receive one of a plurality of conductive structures protruding from the substrate positionable in said at least one of said multiple cavities. Applicant respectfully submits that the references, taken alone or in combination, fail to teach or suggest all of the claim limitations. Applicant respectfully requests reconsideration and allowance of independent Claim 12.

Claims 15, 20, and 21 each depend directly from independent Claim 12, which is allowable. Accordingly, Applicant respectfully requests reconsideration and allowance of dependent Claims 15, 20, and 21.

Obviousness Rejection Based on U.S. Patent No. 5,293,072 to Tsuji et al. or U.S. Patent No. 5,914,531 to Tsunoda et al. taken together with JP 06-151,492

Claims 4, 8, 13, 14, 17, 19, and 22 through 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsuji et al. (U.S. Patent No. 5,293,072) or Tsunoda et al. (U.S. Patent No. 5,914,531) taken together with JP 06-151,492. Applicant respectfully traverses this rejection, as hereinafter set forth.

Claims 4, 8, 13, 14, 17, 19, and 25 through 27 have been cancelled, thus rendering the rejection thereto moot.

As discussed above, the Tsuji reference teaches away from recesses configured to at least partially substantially conformally receive one of a plurality of conductive structures protruding from a substrate positionable in said at least one cavity.

Further, as discussed above, there is no motivation to combine the references because the proposed combination requires a mold that may be positionable in *both a horizontal and a vertical orientation*, in order to retain the benefits of the Tsuji invention. Specifically, there is no teaching or suggestion, found in the references, for a mold apparatus and the attendant equipment and fixtures necessary for selective positioning the mold apparatus between a horizontal and vertical orientation. Applicant respectfully submits that Tsuji and the '492 reference teach and suggest respective orientations suited for their purposes.

Dependent claims 22, 23, and 24 have been amended to depend from independent Claim 3, independent Claim 7, and independent Claim 12, respectively.

Dependent Claims 22, 23, and 24 each include a plurality of conductive structures which comprise pillars or columns. Applicant respectfully submits that the references do not teach or suggest conductive structures comprising pillars or columns. Accordingly, Applicant respectfully requests reconsideration and allowance of dependent Claims 22, 23, and 24.

ENTRY OF AMENDMENTS

The amendments to claims 3, 7, 12, and 22 through 24 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search.

CONCLUSION

Claims 3, 7, 12, 15, 16, 18, and 20 through 24 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned representative.

Respectfully submitted,



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